

## **REMARKS/ARGUMENTS**

Claims 33, 36, 38-46, and 48-53 are pending. In this response, claims 33, 41 and 45 have been amended to more clearly define applicant's claimed methods. These amendments are supported by the application as filed. Claims 44 and 48, moreover, are canceled without prejudice or disclaimer. In addition, new claims 54-61 are added to the application. The new claims are also supported by the originally filed application. There is no issue of new matter.

Entry of the claim amendments and the new claims is respectfully requested. Following such entry, nos. 33, 36, 38-43, 45-46 and 49-61 will be pending in the application.

### **Discussion of the Claim Rejections**

In ¶2 on p. 2 of the Office Action, independent claim 33 and claim 40 which depends from claim 33 are rejected under 35 U.S.C. 103 over U.K. Patent No. 1,567,773 ("Welwyn") in view of U.S. Patent No. 6,916,426 ("Van Slyke"). This rejection is respectfully traversed.

Claim 33, amended as noted above, is directed to a method of treating waste matter from animals. The method comprises:

- a) collecting waste matter from the animals;
- b) reversibly inhibiting urease activity in said collected waste matter; and
- c) separating said urease-activity inhibited waste matter into a urea-rich fraction essentially consisting of a liquid comprising urea and other components soluble in liquid manure and a urea-lean fraction;
- d) recovering the urea-rich essentially liquid fraction obtained in step c); and
- e) recovering the urea-lean fraction obtained in step c);

wherein said reversible inhibition of step b) comprises treating said collected waste matter by a method including at least one step selected from the group consisting of decreasing pH, buffering pH, at least one of decreasing and increasing pressure, at least one of decreasing and increasing ionic strength and combinations thereof.

The Welwyn reference, at page 3 lines 20-50 (a location cited to by the Examiner of this application on p. 2 of the present Office Action) does not disclose that after the waste is collected and subjected to reversible urease inhibition, it is separated into a urea-rich essentially liquid fraction and a urea-lean fraction. Rather, the indicated passage describes that the urine and dung

separates in the house due to the fact that, “*the floor of these houses . . . [is] formed of slats or . . . [is] sloped and slotted*”. This enables, as also taught by the reference, the urine to flow directly and immediately to the tank. In the tank urine is contacted with lime where after the two “fractions” are mixed again. Thus, the “method steps” described in lines 20-50 are in the opposite sequence than the steps used in the method recited, e.g., in claim 33.

Furthermore, applicant respectfully disagrees with the Examiner’s interpretation of paragraph page 3, lines 45-50 (see Office Action, p. 2 ¶5). This passage states, “the dunging area of the animal house is regularly washed down with the alkaline liquor as a sanitary precaution” (page 3 line 45-50). Thus, in the Welwyn reference there is no collection, treatment and separation, notwithstanding the indication to the contrary by the Examiner in the Office Action.

Furthermore, regarding the teaching on temperature contained in Welwyn (page 3 lines 14-20 and 94-100 - note: there is no mention of temperature in lines 40-45 cited to in the Office Action), lines 14-20 teach that optimal temperature for biomass production is between 40°C and 45°C. Applicant respectfully submits that this disclosure can hardly be seen as teaching anything with regard to reducing the reaction rate (i.e., slowing down) of urea decomposition. Lines 94-100 of the reference, moreover, serve only to disclose that before mixing with lime the rate of decomposition of the urea increases with increasing temperature. This, however, is a common effect acknowledged and described mathematically by the Arrhenius equation. Welwyn, therefore, does not teach or even suggest to “*control the temperature*”, notwithstanding the assertion to the contrary at p. 2 of the Office Action. The reference merely states that temperature controls the rate of reaction. As indicated above this is a well-known fact since the late 1800’s and, regardless, Applicant can not discern the relevance of such teaching to presently pending claim 33.

Welwyn discloses a method for treating animal waste to obtain products useful on the land or in animal feedstuff. The method so disclosed comprises contacting the waste with lime to form an alkaline slurry for a time sufficient to provide a sterile slurry (i.e. to kill pathogens), wherein the sterile product is to be placed on a field. Thus, compared to Welwyn the method recited in (amended) claim 33 is distinguishable on the basis of several features, i.e.: 1) collecting the total waste; 2) reversibly inhibiting the urease activity by means other than by adding lime; 3) followed by separation into a urea-rich liquid fraction and a urea-lean fraction; and 4) recovering the respective fractions.

Furthermore, none of the above-noted features that are lacking in Welwyn are found in Van Slyke, which is combined with Welwyn to reject claims 33 and 40. Applicant respectfully disagrees with the Examiner's contention in ¶6 of the Office Action that Van Slyke teaches "*the use of lowering pH in order to reversibly inhibit urease*". Van Slyke does mention addition of proper urease inhibitors in the tank in order to avoid degradation of the ureates. The aim of this is to maintain the urea in crystalline form with potassium, ammonium and sodium (col. 6, lines 55-61). Maintenance of the ureates is essential for obtaining the fertilizer, which is an object of the invention disclosed in Van Slyke. Thus, applicant will only concede that the reference does contain a general mention of urease inhibition.

The passage contained in the Van Slyke reference at from col. 6, line 66 to col. 7 line 3 concerning maintaining an acidic environment  $\text{pH} \leq 6$ , referred to in ¶6 of the Office Action is, in applicant's opinion, unrelated to the passage discussed in the paragraph above. Moreover, it only concerns "*flushed systems*". Additionally, the reference states that the acidic environment is "*maintained*". This disclosure can hardly be understood, therefore, as referring to a reversible inhibition of urea degradation. Rather, it refers to an irreversible inhibition.

Further to the above, in Van Slyke the liquid fraction is not urea-rich since the majority of the urea is bound in the solid fraction with potassium, sodium or ammonium, which is separated from the liquid. In Van Slyke the liquid fraction, i.e. clarified liquid, is recycled in the closed system.

In summary, therefore, both Welwyn and Van Slyke have fundamentally different objects and aims with regard to their respective methods. They do not disclose, nor do they in combination suggest, the sequence and nature of the method steps presently recited in claim 33, particularly in view of the fact that, even the combined disclosure of the two cited references fails to disclose several of the elements recited in the rejected claim(s). Furthermore, even if applicant was to concede, which he does not, that the combination of references cited to reject claims 33 and 40 do suggest all of the claimed features in the order recited in, e.g., claim 33, applicant submits that the Office Action provides no adequate rationale or articulated reasoning as to why one having an ordinary level of skill in this art would be led to combine the cited prior art references in order to attain the method of claim 33.

For the reasons set forth above, therefore, applicant respectfully submits that claims 33 and 40 are non-obvious in view of the combined teaching of Welwyn and Van Slyke and the

Examiner is, therefore, respectfully requested to reconsider and withdraw the rejection under 35 U.S.C. of applicant's claims 33 and 40.

Claims 36, 38 and 39 are rejected in ¶8 of the Office Action under 35 U.S.C. 103 over Welwyn and Van Slyke as applied to claim 33 above, and further in view of U.S. Patent No. 154,092 of Scott. The rejection is respectfully traversed.

Each of the rejected claims 36, 38 and 39 depends, directly or indirectly, from claim 33. The rejected dependent claims, therefore, contain all of the features recited in the 'parent' independent claim 33. As demonstrated above, claim 33 is readily distinguishable – on several bases – over the combination of Welwyn and Van Slyke.

According to the Office Action (see, e.g., ¶9 on p. 3) the Scott reference is cited (i.e., in combination with Welwyn and Van Slyke) due to its teachings: (1) to use phosphate and a divalent metal ion to fix the nitrogen content in the urine; (2) that the fixation of the nitrogen compounds in compounds renders them marketable and also reduces their smell; and (3) the use of phosphate and magnesium for fixing the nitrogen content in urea-rich fractions of waste is the selection of a known material based on its suitability for an intended purpose. Nothing in the Office Action, however, or in the Scott patent, indicates that Scott provides any of the elements of the method recited in, e.g., independent claim 33, that are neither disclosed nor suggested by the combination of Welwyn and Van Slyke (as enumerated in the discussion above). Thus, even when Scott is added to the subject combination (i.e., of Welwyn and Van Slyke), the combined disclosure still would neither disclose, or even suggest the method recited in claim 33.

Since, as indicated above, the rejected claims 36, 38 and 39 all include, in addition to the features expressly recited thereby, each of the features recited in claim 33, the rejected dependent claims are all believed to be distinguishable over the cited combination of references for the same reasons as claim 33.

For the reasons above, therefore, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 36, 38 and 39 under 35 USC 103.

In ¶12 on p. 4 of the Office Action, claims 41-44, 48 and 50-53 are rejected under 35 U.S.C. 103 as being allegedly unpatentable over Welwyn and Van Slyke, as well as Scott. Claims 44 and 48 are canceled (without prejudice or disclaimer) in this Amendment. Thus the rejection is mooted as to those claims. As to the remaining rejected claims (i.e., nos. 41-43 and 50-53), the rejection is respectfully traversed.

The rejected claims are written using the “product-by-process” format. With regard to the ‘main’ claim, i.e., claim 41, which is directed to a product produced according to the method of claim 33, the Office Action states that, “Welwyn and Van Slyke teach the method of claim 33, which produces a urea-rich fraction having reversible urea inhibition. The product of claim 41 is therefore obvious as the product of an obvious process.” In response, applicant submits that, as demonstrated above, Welwyn and Van Slyke, taken alone or in combination, do not teach or suggest the method recited in claim 33. Thus, the process (of claim 33) is not obvious over those references, nor is the product of the process - as now recited in claim 41.

Notwithstanding the above, however, and in an effort to advance the prosecution of this application, applicant has amended claim 41 in this Response to incorporate therein the subject matter of claim 44. That is, as now amended, claim 41 recites, *inter alia*, that the claimed product comprises animal waste matter indicators in a range of from 200 mmol/l to 5 µmol/l. Neither Welwyn nor Van Slyke disclose the presence of such waste-matter indicators and applicant therefore submits that claim 41 as amended is distinguishable over the cited art. Applicant does take notice of the statement on p. 5, para. 16 of the Office Action that, as Welwyn teaches no purification or removal step, animal waste matter indicators will ‘inherently’ be contained in the product produced in accordance with the reference. Applicants submit in response, however, that this view rests only on an assumption by the Examiner, and not on any specific disclosure contained in the reference, i.e., the argument is that because there is no teaching to remove something, it must be there. However, the reference itself does not expressly disclose that the subject indicators would be there in the first place, and applicant thus respectfully traverses the Examiner’s rejection of claim 41. Furthermore, as the remaining rejected claims, nos. 42, 43 (as noted above claims 44 and 48 are canceled without prejudice or disclaimer) and 50-53 all depend, directly or indirectly on (amended) claim 41, they each contain all of the features recited in the subject claim. As such, the dependent claims are believed to be distinguishable for the same reasons as claim 41.

For the reasons set forth above, therefore, the Examiner is respectfully requested to reconsider and withdraw the rejection of claims 41-43 and 50-53 under 35 U.S.C. 103.

Claims 45 and 46 are rejected in ¶18 of the Office Action under 35 U.S.C. 103 over Welwyn in view of U.S. Patent No. 4,349,572 to Larson et al. (“Larson”). The rejection is respectfully traversed by the applicant.

In response to the subject rejection, applicant notes that claim 45 has been amended such that, in its present form it recites a method of producing thermosetting urea-formaldehyde plastic from waste matter of animals. This also is in response to the Examiner's comments at ¶25 of the Office Action wherein the Examiner argued that the features relied upon in the arguments presented in applicant's previous response filed in this application were not recited in the rejected claims. Due to the above-noted amendment, the claims now do recite the feature(s) relied upon by applicant. Neither Larson nor Welwyn, individually or together, contain any indication of using urea from animal waste to prepare such a thermosetting plastic, i.e. urea-formaldehyde.

For the reasons provided above applicant respectfully disagrees that Welwyn et al. disclose the sequence of method steps recited in claim 45. Specifically in Welwyn urine and dung is first separated by way of urine being led away in the slats of the floor. The washing of the floor referred to by Examiner is washing of the dung left behind on the stable floor, which washing is performed for the purpose of sanitation. After the urine has gone from the stable floor, it is treated with lime in the tank and, eventually, the two fractions (urine and dung) are combined as dung is "*trodden through the slats*". However, at this point urine has already been treated in the tank.

Furthermore, the applicant also cannot see the relevance of the temperature aspect disclosed by the reference, as this is not a feature recited in either claim 45 or 46.

Turning, next, to the reference combined with Welwyn to reject claims 45 and 46, Applicant agrees with the Examiner's characterisation that Larson teaches that contacting the excreta with formaldehyde destroys pathogenic faecal microbes and prevents mold growth. However, the combination of this disclosure with the features of the method as disclosed in Welwyn does not teach, or even suggest, the method now recited in (amended) claim 45 of the present application. Furthermore, neither of the two cited references contain any incentive or suggestion which would lead one having an ordinary level of skill in this art to employ their respective teachings in a method relating to producing a polymer material such as is now recited in claim 45.

In particular, in the method disclosed in Larson formaldehyde is added directly to the animal waste where it is allowed to react with ammonia and free amines, i.e., of proteins or the like, of both soluble and insoluble constituents. In column 3, lines 55-58, the Larson reference

states that, *“the feed product is essentially neutral, contains virtually no free ammonia or amines, and furnishes a large proportion of the protein and fat content necessary for the ruminant diet”*. In contrast, in the method as recited in claim 45 the animal waste is subjected to a solid-liquid separation step prior to reacting the urea-rich, urease-inhibited liquid fraction with methanal. Thus, in applicant’s claimed method only soluble components are reacted with methanal. Table 1 of the present application shows typical ranges of constituents of the urea-rich liquid fraction based on the contents of pig urine. It is seen that the major constituent is urea, and therefore the major product, unlike that of the method of Larson, will be urea-formaldehyde.

The product described by Larson, furthermore, is not a polymer material. Claim 1 of Larson, in contrast, requires a product, *“having acceptable aesthetic and organoleptic properties”*. In light of these desired aesthetic and organoleptic properties it can be expected that the presence of a solid fraction is desirable since the organoleptic properties are dependent on the presence of solid material. Moreover, as it is an object of Larson to *“provide a supplemental feed composition derived from livestock waste”* (column 1, lines 33-35), it appears that the interest of Larson is to utilize as much as possible, including the solid fraction, of the animal waste. The disclosure contained in Larson can even be said to teach away from utilizing mainly the urea present in the liquid fraction.

Thus, in conclusion the teaching of Larson cannot be combined with the urease inhibition method of Welwyn to arrive at the method of the claim 45 of the present invention. Where Welwyn separates a liquid from a solid fraction, Larson adds aldehyde immediately to the animal waste. Larson has no interest in producing a thermosetting plastic, i.e. urea-formaldehyde, but appears to have an interest in recycling as much as possible, and not just a specific component of, the animal waste.

Even if, moreover, isolated features of the teachings contained in both of the two cited references were combined, such combination would not in fact produce or even suggest the method recited in claim 45, as neither of the cited references provide a method resulting in a thermosetting urea-formaldehyde plastic.

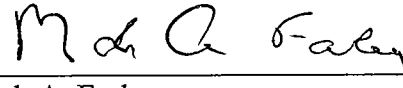
Therefore, based on the remarks above, applicant respectfully submits that the method recited in claim 45 is not obvious in view of Welwyn and Larson. The Examiner is, therefore, requested to reconsider and withdraw the rejection of the subject claim. Furthermore, due to its dependence upon claim 45, claim 46 includes all of the features contained in claim 45. Thus,

claim 46 is believed to be distinguishable over the cited combination of references for the same reasons as claim 45. The rejection of claim 46 should, thus, also be withdrawn.

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Respectfully submitted,

A handwritten signature in cursive script, reading "Mark A. Farley", positioned above a horizontal line.

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